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Dr. Torrey as a Botanist*

BY NATHANIEL LORD BRITTON

The botanical work of John Torrey is a grand contribution to science, and among the most permanent of that of all students of the North American flora. Born in New York, Aug. 15, 1796, he was early associated with Major LeConte, who later contributed largely to the literature of the biological sciences, with Dr. David Hosack, who, during Torrey's youth, was engaged in the development of the Elgin Botanical Garden, where Torrey studied under the direction of that eminent physician and naturalist, and he early came into relations with Professor Amos Eaton, the most prominent American botanist of that time. Hosack used to refer to him as "the young man with an old head" and this title was taken up by his class in the College of Physicians and Surgeons, he being called the "old head" of the class.

During his youth he collected and observed plants of the vicinity of New York with great assiduity, and on May 5, 1817, he was appointed by the Lyceum of Natural History, then recently founded, and of which he was one of the original members, in conjunction with Dr. C. W. Eddy and Mr. D'Jurco V. Knevala, as a committee, to prepare a catalogue of the plants growing in the neighborhood of the city. The celebrated Dr. Samuel L. Mitchell was at that time president of the Lyceum. Torrey must have been even then familiar with the flora, for the note book used by him, and on which the catalogue is apparently based, is preserved as one of the most cherished records of his early studies, and the work was presented to the Lyceum for publication, December 22d of the same year. It was actually published at Albany, in 1819, the advertisement bearing date of February 16th, the year following his obtaining his degree of Doctor of Medicine. His botanical studies, therefore, were prosecuted extensively during his medical course of study. He soon became well and

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favorably known as a botanist; in 1822, in the preface to the third edition of his "Manual of Botany" Professor Eaton says: "Dr. Torrey, of New York, suggested the most valuable corrections and improvements to be found in this edition. And I believe I may encourage the reader with the hope that the extensive collection of materials in his possession will, very soon, appear before the public in the form of an enlarged system of the botany of the northern States. Such an extended view of the subject would be an invaluable treasure to all lecturers, private teachers, and to all others who are disposed to enter deeply into the study." These statements, it may be remarked, are not alone appreciative of Torrey's work, but indicate considerable generosity on the part of Eaton. In the second edition of "Florula Bostonensis," 1824, Dr. Bigelow refers to Torrey's work as follows: "To students of the present volume who may wish to extend the sphere of their inquiries I have great pleasure in recommending the flora of the middle and northern section of the United States, by Dr. Torrey, of New York, now in the course of publication. The accuracy and constancy of pursuit manifested by this gentleman entitle him to all praise from those who appreciate the amount of perseverance necessary to accomplish labors of this sort."

The work thus heralded by Eaton and Bigelow was published during the year 1824 under the title "A Flora of the Northern and Middle States, or Systematic Arrangement and Description of all the plants heretofore discovered north of Virginia." Dr. George Thurber, on the occasion of his election as President of the Torrey Botanical Club, April 29, 1873, in an inaugural address, in which he presented an account of Torrey's life and work, records that the last pages of this Flora were written on the morning of Torrey's wedding day.

Further appreciation of his early work is shown in the writings of other contemporary botanists. In the second volume of the "Sketch of the Botany of South Carolina and Georgia," 1814, Dr. Stephen Elliott says, that to Dr. John Torrey, of New York, he is indebted for many of the plants of New Jersey and New York, for an opportunity of comparing many doubtful species, and of ascertaining many of the plants of Pursh, which were to him uncertain or obscure. Dr. William Darlington in "Florula

Cestrica," 1826, remarks, "After this catalogue went to press I had the good fortune to commence an occasional correspondence with that distinguished naturalist, Professor Torrey, of West Point, which correspondence has, to me, been a source of instruction and pleasure—alloyed only by a regret that I had not earlier enjoyed that advantage. For the information, and specimens, received from him, I beg leave here to offer my sincere and grateful acknowledgements."

Interest centered about this time among botanists on the availability for practical purposes of teaching and the arrangement of floras, of the "Natural System" of Jussieu, as elaborated and modified by Lamarck, DeCandolle, Lindley, and other European authors. Eaton, had, already in the earlier editions of his Manual, referred to this topic, but did not adopt the innovation. The first American edition of Lindley's "Introduction to the Natural System of Botany," was edited by Torrey and published in New York in 1831, and to it he appended a "Catalogue of North American Genera of Plants arranged according to the Orders of Lindley's Introduction to the Natural System of Botany, with the number of species belonging to each genus so far as they are at present determined." Torrey thus gave to American students the first comprehensive view of the system as applied to their own plants, and, like most other suggestions for a radical change of method, it was received with some consternation. Eaton says of this book, in the sixth edition of his Manual, 1833, "Since Dr. Faustus first exhibited his printed bibles in the year 1463, no book has, probably, excited such consternation and dismay as Dr. Torrey's edition of Lindley's Introduction to the Natural System of Botany. And to make the horrors of students, as well as of ordinary teachers, still more appalling, Dr. Torrey's Catalogue of American Plants at the end of his Lindley, was so singularly presented that it would seem to indicate an awful catastrophe to all previous learning." And Eaton never did accept it in his books, though he discussed it at great length at this point and subsequently; neither did Bigelow. It was accepted, however, with minor modifications by Dr. Lewis C. Beck in his "Botany of the Northern Middle States," published at Albany in 1833, and later by Darlington. Torrey and Beck were, therefore, the Ameri-

can leaders in this forward step, and there can be no doubt that if their lives could have been extended into the period of the next overturn of taxonomy by the development of the revolutionary line of thought, that they would have promptly accepted the Eichler and Engler systems of to-day. Naturally, all Torrey's subsequent writings were based on this so-called Natural System.

Dr. Torrey early became especially interested in the Cyperaceae, and accumulated collections of sedges very extensive for the time. His studies were presented to the Lyceum of Natural History in 1836, and published during the same year in the *Annals* under the title "Monograph of North American Cyperaceae." He did not publish much additional on the family, however, though he kept a copy of the paper posted up, which has been of much service to subsequent students. In fact the great mass of miscellaneous specimens which now began to pour in on him from all over the country, and especially the determination and description of much of the material obtained by the numerous government exploring expeditions, the preparation of the Flora of the State of New York, and of the Flora of North America, the latter in conjunction with Dr. Asa Gray, who made the acquaintance of Torrey while serving as Curator of the Lyceum as early as 1831, left him no time for the monographing of groups. In fact his only other considerable treatment of a large group is the "Revision of the Eriogoneae," jointly with Dr. Gray, published in 1870.

He was appointed Botanist of the Geological Survey of New York, at its organization in 1836. In the prosecution of his duties in this capacity he was aided by all the botanists resident at that time within the State, in bringing together the voluminous material which was published in 1843 as "A Flora of the State of New York," in two large quarto volumes, illustrated by 161 plates, a work which stands to-day as the most noteworthy, elegant and complete presentation of a local flora of any produced in the United States. It is recorded that he had to purchase a copy of this work in order to secure one, such restrictions having been made by those in charge of its publication. A roll of proof sheets was found subsequently, however, and given by Dr. Torrey to Dr. Thurber, who in 1873 said of them, "handsomely bound, it is one of the prized works in my library, and is unique as being

the only copy in existence 'presented by the author.' " This copy is now the property of Professor Byron D. Halsted, and through his courtesy we are able to exhibit it to you to-day.

During the progress of this great work on the flora of New York, the Torrey and Gray "Flora of North America" was also in preparation. Dr. Gray says of this "Early in his career Dr. Torrey had resolved to undertake a general Flora of North America, or at least of the United States arranged upon the natural system, and had asked Mr. Nuttall to join him, who, however, did not consent * * * It was in the year 1836 or 1837 that he invited the writer of this notice—then pursuing botanical studies under his auspices and direction—to become his associate in the Flora of North America." The first part of the first volume was published in July, 1838, the second in October, 1838, the remainder of the first volume in 1840; the first part of the second volume in 1841, the second in the spring of 1842, and the third, the last of February, 1843. Dr. Gray further remarks "from that time to the present, the scientific exploration of the vast interior of the continent has been actively carried on, and in consequence new plants have poured in year by year in such numbers as to overtask the powers of the few working botanists of the country, nearly all of them weighted with professional engagements. The most they could do has been to put collections into order in special reports, revise here and there a family or a genus monographically, and incorporate new materials into older parts of the fabric, or rough hew them for portions of the edifice yet to be constructed. In all this Dr. Torrey took a prominent part down almost to the last days of his life."

Remarking on the suspension of publication of this great desideratum Dr. Thurber says: "Its authors pursued the best course; instead of giving their time to the completion of the flora and allowing the new materials to pass—as they inevitably would have done—into the hands of European botanists, they turned their attention to studying and recording them. Now these discoveries of American plants are mainly recorded by American botanists in American publications, and to secure this result it was well that the *Flora* was suspended." With the further prosecution of the plan of Torrey, subsequent to his death, by Dr. Gray and

his assistants and successors at Harvard University we are all familiar; the first part of "Synoptical Flora of North America" appeared in 1878, and during twenty-two years a small part of the field has been covered. The work is one of stupendous magnitude, and the amount of new material yet being collected in nearly all parts of the country still pours in, placing the present endeavor in much the same difficult position as the one faced by Torrey and Gray in 1843. The extensive studies of the lower plants have brought a new element into the problem, and our territorial extension another one, while still another is apparent in the critical studies of American botanists on the flora of the continent south of the Rio Grande, this latter making it almost necessary that the descriptive botany of Central America should be written by American botanists. The systematic North American Botany of the future, may then readily be foreseen to cover the continent in its broadest definition, not excluding the West Indies. How this may be accomplished in a reasonable space of time, is a problem to which the attention of all North American botanists may advantageously be given.

During the two decades subsequent to 1843, Dr. Torrey's studies were mostly concentrated upon the determination and recording of the botanical results of the numerous expeditions sent out to the far West by the United States government, and in this work he was associated with Dr. Gray, Dr. Newberry and others. He worked up the collections of Nicollet, Frémont, Emory, Stansbury, Marcy, Sitgreaves, Pope, Beckwith, Gunnison, Whipple, Williamson, Parke, and Ives, as well as the enormous collections made by Parry, Wright, Bigelow, and Schott on the survey of the United States and Mexican Boundary.

Shortly after the publication of the Botany of the Mexican Boundary in 1859, Dr. Torrey transferred his herbarium and botanical library to Columbia College, and for the next ten years he was chiefly occupied in herbarium work. A large part of the herbarium was mounted by himself, and his constant observations are recorded in the great number of sketches of floral dissections with which it is enriched; in fact most of his critical studies on plant morphology are thus recorded by his pencil. He was in this work accurate and painstaking to an astonishing degree; the

identification of the specimens actually examined by him leaves nothing to be desired. His last published works are the "Revision of the Eriogoneae," jointly with Dr. Gray, and "Phanerogamia of Pacific North America" issued in 1874, subsequent to his death, which occurred on March 10, 1873.

Dr. Torrey's botanical correspondence was very voluminous, and much of it is preserved both at Columbia and at Harvard. He was in correspondence with practically all the prominent taxonomists of his time. He was little given to argument, criticism or discussion, and, while difficult to divert from a course once determined upon, there is little left to show that he was acrimonious or unpleasant to any of his contemporaries. Even with the original and discursive Constantine Schmalz Rafinesque, whose letters to Torrey extend from 1819 to 1840, friendly and peaceful relations were evidently maintained. An extract from one of Rafinesque's letters written at Philadelphia in 1838 is of interest in this connection :

"My good friend. Your letter of 25th Jan'y was delivered by Dr. Gray quite lately with the 3 small pamphlets. I now send you some pamphlets of mine also, in which you will see that I have been engaged in various labors for a year past and it is a wonder that I could attend to Botany all the while as an amusement and relaxation, if you knew all what I had to attend to last year, in order to bring forth at last my great labors and prepare the means for future activity in the midst of pecuniary difficulties and disappointments. But with zeal and patience I overcame all at last and I have long ago concluded 600 pages of my supplemental Flora and Flora Telluriana or 6 parts. If I had not undertaken these two works together, the first would have been completed ere now, but will be ere 1840. As it is quite a mantissa and you do not admit my improvements, we shall not clash in the least. But between 10 and 20 years hence you will admit of all my discoveries and new genera as you now begin to do for those of 1808 to 1825. * * * I have published so many works that I don't know which you lack yet. I send most of them and a list to the Lyceum for the series of their Annals brought me by Dr. Gray. We had some botanical conversation together and I find he calls himself a lump, like you, belonging to the putting off school of

knowledge, although his writings are expansive and dive into the invisible anatomy of plants. It is that putting off school that is now impeding the Exploring Expedition, as it is impeding the rapid progress of knowledge in all the sciences but times bring on the due changes and improvements in spite of all delays. As usual your old friend, &c.

C. S. RAFINESQUE.

Such, in brief was the botanical lifework of the man whose memory we meet to honor. When we consider that his profession was medicine, and his livelihood chemistry, he having lectured on that science at West Point, New York and Princeton during the period of his greatest botanical activity, as well as occupying the post of United States assayer in New York, we can but wonder that he could have accomplished so much.

His life and works have been the principal inspiration which has enabled his associates and successors to uphold the cause of botany in New York, and to that inspiration may be referred the long and honorable record of the Club which bears his name, and through it, by the coöperation of civic and private philanthropy, the development of the institution where we meet to-day.

A bibliography of the writings of Dr. John Torrey is hereto appended.

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